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A VISIT TO THE SOUTH PACIFIC

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On December 25, 1971, my wife and I, accompanied by four other persons, departed on a visit of five weeks to New Zealand and Australia, with stop-overs in Tahiti and the Fiji Islands. The main objectives of this trip were to acquire some knowledge of the plants of these remote areas and to obtain photographs and herbarium specimens for the collections of the Arboretum. Another and very important purpose was to lay the groundwork for a possible Arboretum Tour in the reasonably near future.

We flew from Philadelphia to Mexico City and there took a plane direct to Tahiti arriving in Papeete, the capital, at dawn the following day. The transition from winter into summer in so short a time is always an exciting experience and even in the faint rays of the rising sun we could make out palm trees, oleanders and bougainvilleas.

Our hotel, which was constructed like a quarter section of an Egyptian pyramid on a steep declivity, offered a commanding view of the sea and of the island of Moorea, a few miles to the north.

A mid-morning walk around the hotel grounds revealed a wealth of tropical vegetation, some indigenous but a great deal of introduced origin. Much in evidence was *Hibiscus tiliaceus,* a ubiquitous tropical tree with large yellow flowers which turn pinkish as they fade. Other species of this genus were *H. rosa-sinensis* and *H. schizopetalus.*

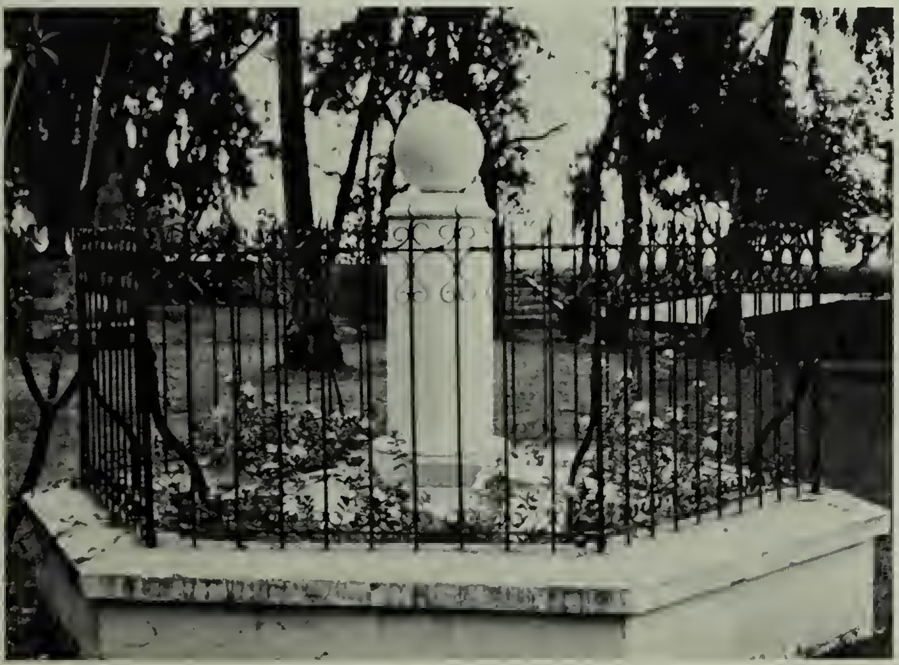

Fig. 1. Transit of Venus Monument

Fig. 2. Bora Bora

The royal poinciana or flamboyant tree (*Delonix regia*) was making a fine show with its vivid red flowers. This plant, which is indigenous to Madagascar, is reported to be on the verge of extinction in its native country.

Two species of *Cassia* were much in evidence: the golden shower (*C. Fistula*), which comes from India and Ceylon and the pink shower (*C. javanica*), a native of the East Indies.

Lagerstroemia speciosa (*flos-reginae*) from tropical Asia, was creating a good display with its upright trusses of rosy-pink flowers and the shell ginger, *Alpinia speciosa* (*nutans*), another Asiatic species, was widely naturalized. *Clerodendron paniculatum,* which also comes from tropical Asia, is known locally as Pope's-hat, in reference to its large hemispherical inflorescence of scarlet flowers. *Morinda citrifolia* (of the Rubiaceae) was beginning to ripen its large aggregate fruits and at the same time displaying a few of its white tubular flowers.

As if to compensate for this luxuriance of exotic material, the breadfruit, *Artocarpus incisa* (*altilis*) was everywhere conspicuous, its enormous sub-globose fruits approaching maturity. Admittedly, there is some question as to the original home of this important tree. There can be little doubt, how-

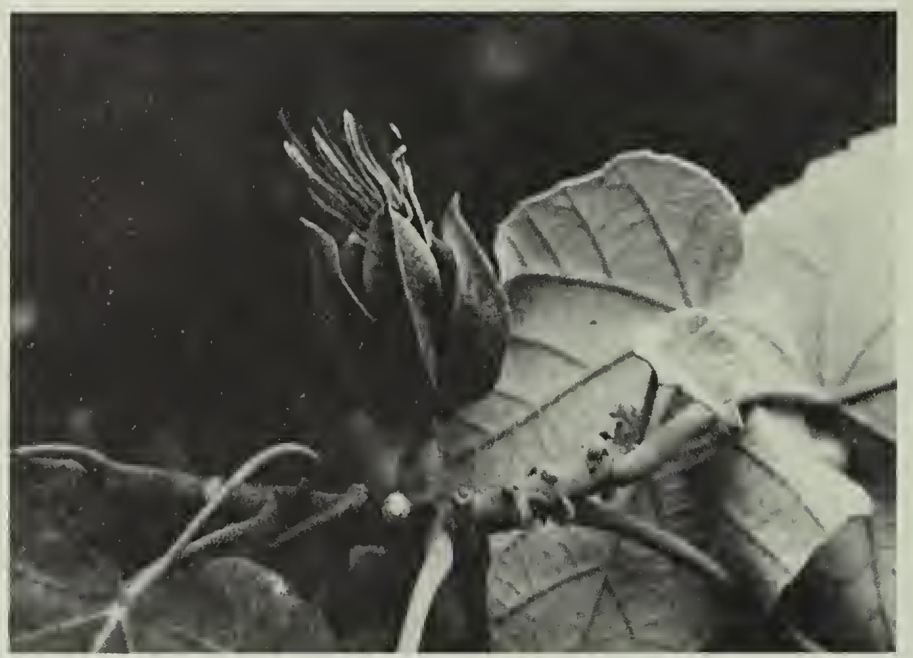

Fig. 3. *Cheiranthodendron pentadactylon*

ever, that it was universally distributed throughout the South Pacific long before the advent of white man. Indeed it was to Tahiti that Captain William Bligh, commander of the ill-fated Bounty, came in 1788 to collect young plants of breadfruit for the purpose of introducing them into the West Indies. Unfortunately, the thousand or so specimens which David Nelson, botanist of the expedition, had amassed were thrown overboard by the crew at the time of the mutiny the following April. Several years later (1793) Bligh was successful in introducing the breadfruit on St. Vincent's Island in the Lesser Antilles.

That afternoon we set forth on a tour of the island. Our first stop was at Matavai Bay, a few miles east of Papeete on the northern coast. It was here that Captain James Cook in command of H.M.S. Endeavour made a landfall in the spring of 1769. It was here also that the members of his scientific staff observed a transit of Venus on June 3. This significant event is commemorated by a small monument erected on the site (Fig. 1). This was but the first of several occasions on which we were to cross the tracks of this great navigator and humanitarian.

Continuing eastward around the northern shore, we came to the Tahiti Botanic Garden, small in area but rich in species of tropical trees and shrubs. To us one of the most interesting was *Warszewiczia coccinea.* Like several other members of the Rubiaceae (e.g. *Mussaenda, Calycophyllum, Pinckneya*) the corollas are small but one of the sepals is enormously enlarged into a bract-like structure which in this species is a brilliant red. Other noteworthy plants were *Chrysophyllum oliviforme* (a representative of the Sapotaceae in which the under leaf-surfaces are resplendently clothed with silky copper-colored pubescence), *Excoecaria bicolor* (Euphorbiaceae) which also possesses interesting foliage, the upper surface of the leaf being dark green, but the lower brick red, *Pimenta dioica* (*officinalis*), the allspice of commerce, and *Duranta repens* (*Plumieri*), a Verbenaceous tree from the West Indies and South America. The New World tropics were also represented by several species of *Heliconia.*

Just a short distance from the garden is the Gauguin Museum, containing memorabilia of the French painter who lived in Tahiti during the 1890's. Our drive back to the hotel took us around the east and south shores of the island, past several elegant private gardens and an occasional patch of taro (*Colocasia*). Our driver informed us that there is great rivalry among the owners of these gardens and that the Government each year awards prizes to the most outstanding.

On Monday, December 27, we flew to Bora Bora, one of the westernmost of the Society group. Our flight took us over Moorea, Huahine and Raiatea, (where we put down briefly) and landed us on a strip on the outer reef of Bora Bora, whence we took a launch across the lagoon to the hotel where we were to have lunch. (Fig. 2).

Of the many plants in flower on the grounds surrounding the hotel there is space to mention only two. One was a fragrant native gardenia (*G. tahitiensis*) with shiny evergreen leaves and pure white corollas. The other was *Calophyllum Inophyllum,* an arboreal member of the Guttiferae, by no means rare in this part of the world, but of interest because it was here in full bloom with fluffy white flowers and globular unripe fruits which were already beginning to fall by myriads on the coral strand.

That afternoon, before flying back to Papeete, we spent a pleasant hour in a glass-bottomed boat cruising about in the lagoon. The water here was exceptionly clear and the submarine life indescribably diversified and interesting. Bora Bora has been called the most beautiful island in the Pacific. We have no inclination to dispute that claim.

On the morning of Tuesday, December 28, we flew to Auckland, New Zealand, losing a day as we crossed the International Date Line.

That afternoon Mr. Philip J. Jew, Manager of Parks and Reserves of the Auckland Regional Authority, called for us at our hotel. He took us first to the summit of Cashmere Hill, one of two extinct volcanic craters which dominate the city and from which we enjoyed an impressive view of Auckland and the surrounding country.

We then drove north to Wenderholm, a recreational reserve which is administered by the Regional Authority. This is an extensive area of low undulating dunes extending for several miles along the sea and terminated to the north and south by steep cliffs. The grassy strip behind the dunes is devoid of almost all vegetation save for a dense canopy of *Metrosideros excelsa.* This handsome species, known throughout New Zealand as "rata", is a member of the Myrtle Family or Myrtaceae which contains many genera in this part of the world. Although here somewhat past the peak of its bloom,

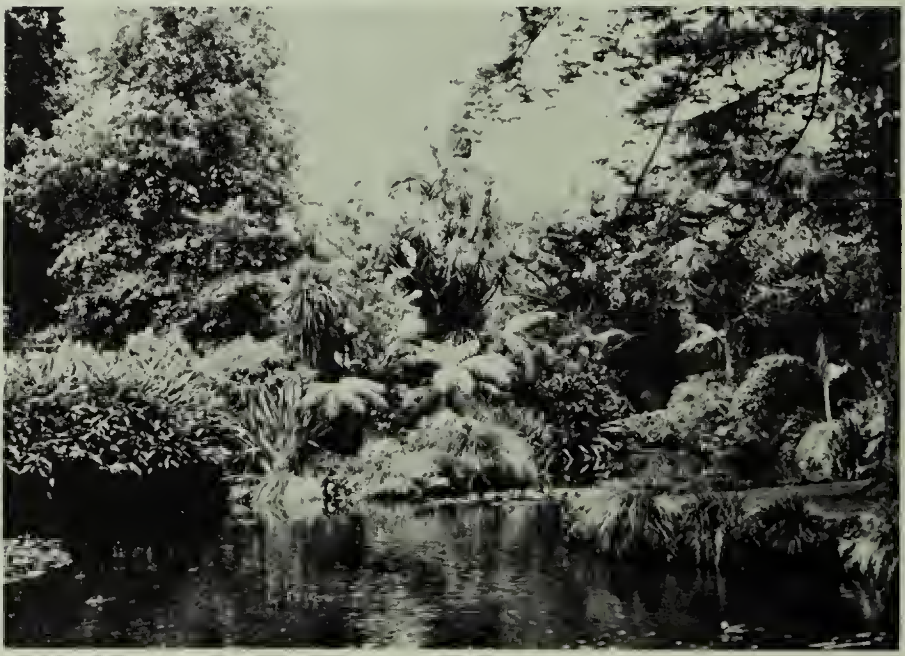

Fig. 4. Pond in Auckland Domain

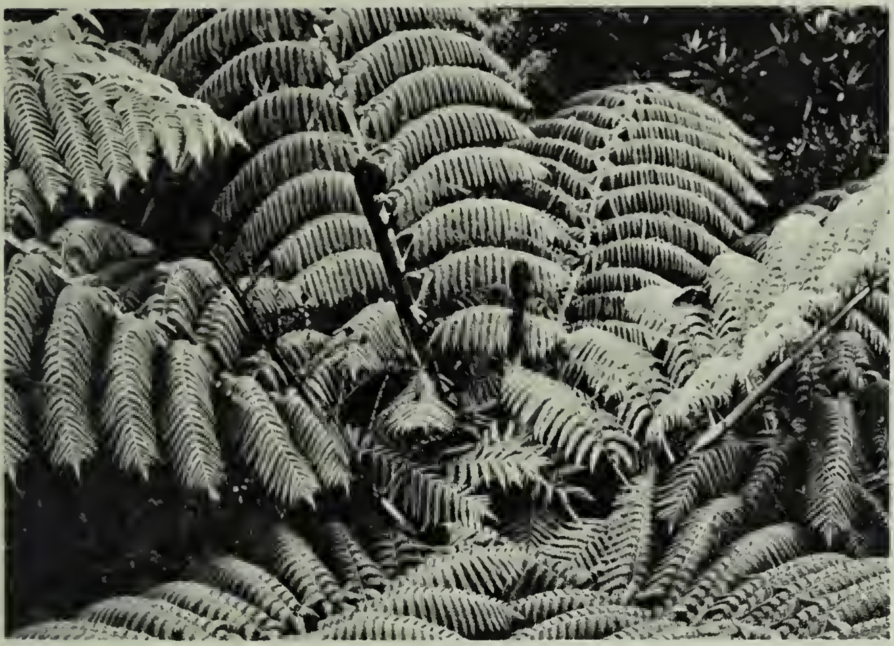

Fig. 5. *Cyathea medullosa*

many of the trees still retained their large hemispherical clusters of dark red flowers.

In a section of the Reserve, which had not been cleared for recreational purposes, were several plants of considerable interest. One of the most surprising was *Vitex lucens* of the Verbenaceae, a sturdy tree with shiny evergreen leaves, strikingly different in aspect from the shrubby members of this genus cultivated in so many American gardens. Another unfamiliar tree was *Corynocarpus laevigatus*, a representative of a small South Pacific family with glossy oblong foliage and globose fleshy fruits.

On the following morning Mr. Jew drove us first to Albert Park, one of Auckland's fine garden areas. Among the plants we observed here was our own southeastern bull-bay, *Magnolia grandiflora.* We were to see this species frequently elsewhere in New Zealand, as well as Australia, thus seeming to justify a statement I had made in print long ago that it might well be the most widely cultivated temperate tree in the world. I had already photographed it in many parts of Europe, several countries in Asia, all over South America and in Africa from Cape Town to Nairobi.

We were delighted to see the hand-flower tree in full bloom. This is *Cheiranthodendron pentadactylon,* a native of Mexico and Guatemala, placed by most authors in the Sterculiaceae. The corolla is lacking, but the cup-shaped calyx is conspicuous and the five large reddish stamens extend beyond it like the fingers of a hand. (Fig. 3).

Also in bloom was *Lagunaria Patersonii,* a member of the Malvaceae from Australia and the Pacific islands with pinkish flowers resembling a hibiscus. Afterwards we saw this species widely used as a street tree both in New Zealand and Australia.

Although Australia is extremely rich in Protaceae (a group which it shares with Africa) this family is poorly represented in New Zealand, where *Knightia* is one of only two or three genera. We were therefore pleased to see *K. excelsa* and, as a consequence, were able to recognize it when we encountered it later in the wild.

We went next to visit Auckland Domain, an extensive park containing several government buildings and a fine collection of native and exotic plants. (Fig. 4). Here we saw our first specimen of *Agathis,* in this case *A. robusta,* a native of Australia, rather than the New Zealand species which we were to see later in the day. *Agathis* is now considered as a member of the Araucariaceae, together with *Araucaria.*

Among other interesting or unfamiliar plants which we saw here were *Meryta Sinclairii,* (an evergreen genus of the Araliaceae) *Ochna multiflora, Mahonia lomariifolia,* and *Michelia Doltsopa,* the last-named being a member of the Magnoliaceae.

Students of the Coniferae have been insisting in recent years that the genus *Libocedrus* is restricted to the southern hemisphere and that the incense cedar of our Pacific coast should be called *Calocedrus.* It was therefore instructive to see a fine plant of *Libocedrus plumosa* and to note the character of its foliage, so different from our plant, which has long been known as *L. decurrens.*

The Domain contains a conservatory which houses a good collection of tropical material and around which are plantings of succulents and other ornamentals. A fascinating item was *Puya alpestris,* an enormous bromeliad from the Andes with an inflorescence at least three feet tall.

We went next to Eden Park, a very attractively designed small garden, created and maintained by a public-spirited group of amateur horticulturists. Several pages would be required merely to list the wealth of material in this gem of a garden; three items, however, seem worthy of special note.

It should be borne in mind that the familar conifers (pines, firs, spruces, hemlocks, cedars, larches junipers, etc.) of the northern hemisphere are almost entirely lacking south of the Equator. Their places are largely taken by two families of Gymnosperms: the Araucariaceae and the Podocarpaceae. The first of these, which includes *Araucaria* and *Agathis,* has already been mentioned. The latter contains *Dacrydium* (the so-called red pine of New Zealand), *Podocarpus* (of which there are four species in this archipelago) and *Phyllocladus* (known as celery pine). The last-named is of particular interest because its lateral shoots are modified as flat leaf-like structures. All three of these genera were present in this superb garden.

We drove out to view the 150 acre property which has been acquired as the site of Auckland's Botanical Garden. The development of this area is to take place in the near future. Mr. Jew then took my wife and me to his home where we had lunch with his charming wife and three interesting children.

Before leaving Philadelphia I had written to our host expressing a keen desire to see a bit of an original kauri forest, if any such still existed. Kauri, as already indicated, is *Agathis*

Fig. 6. Forest near Lake Okataina

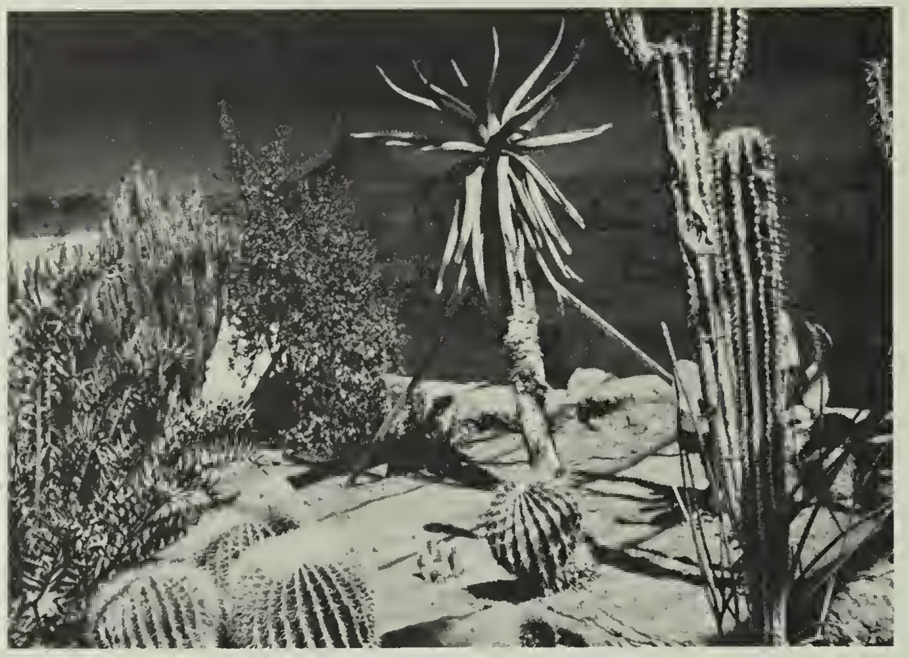

Fig. 7. Succulent house in Christchurch Botanic Garden

australis, a huge tree which at one time formed dense forests in the vicinity of Auckland. Because of the value of its timber, vast areas have been decimated, but a few stands have been preserved. Accordingly, after lunch we drove northward some fifteen miles to a State forest plantation where we met the head ranger and transferred to a land rover. A rough but short drive and a stiff but brief climb brought us into a region of kauris with trunks six feet in diameter and, according to the ranger, probably 1500 years old! These trees certainly rank in size and impressiveness with the coast redwoods of California and the eucalypts of western Australia. Kauri or kawri gum, a partially fossilized resin obtained from this tree, is used in the manufacture of varnish. It is often found below the surface of the ground in regions where years ago this species formed vast forests. A conspicuous epiphyte here was *Astelia nervosa,* looking very much like our American bromeliads, but actually a member of the Liliaceae.

Among the lesser components of this forest were the rimu (*Dacrydium cupressinum*) and the totara (*Podocarpus totara*), both Gymnosperms, and often referred to as "pines". We had been eager to see the New Zealand tea tree, a member of the genus *Leptospermum* belonging to the Myrtaceae. Here on the edge of the forest were two species: *L. scoparium* and *L. ericoides,* growing as shrubs, rather than as trees. Here also was *Coriaria ruscifolia,* related to the more familiar *C. japonica* (which is hardy with us) and reputedly just as poisonous.

Fig. 8. The Mt. Cook Range

Among the most conspicuous features of the rain forests of New Zealand are the tree ferns and on this same afternoon we saw both *Cyathea dealbata* and *C. medullaris,* the latter growing in the vicinity of the Waitakeri Dam. (Fig. 5). This was truly a banner day.

On Friday, December 31, we flew from Auckland to Rotorua, a region famous for its thermal springs and geysers. It was here that such early plant hunters as Colenso, Dieffenbach and Bidwill collected and it was from this locality that they traveled south and west to explore Lake Taupo and New Zealand's active volcanoes.

Our headquarters here were on the shores of Lake Okataina, reached by a road that ran for several miles through dense tropical forest composed largely of tree ferns, their great fronds touching overhead to form a natural tunnel (Fig. 6). This was our first contact with the type of luxuriant growth which at one time must have covered much of this portion of North Island.

Although it rained all the time we were at the Lake (our only bad weather on the entire trip) this can be no deterrent to a botanist in unfamiliar country who wants to see the native vegetation. It was my very good fortune that one of the guests at the hotel was Mr. E. O. Fox, of Auckland, who possessed an intimate knowledge of the local flora. He and I went out into the bush one afternoon, got wet to the skin in the first five minutes, but came back with 25 or 30 specimens which Mr. Fox helped me name and which have been incorporated into the herbarium at the Arboretum. The following few seem deserving of special mention:

Fig. 9. Queenstown

Fuchsia excorticata. An arboreal species of *Fuchsia* with lavender flowers and lanceolate leaves which are whitish beneath.

Melicytus ramiflorus. A shrubby or tree-like member of the Violaceae, with small flowers crowded along the branchlets.

Knightia excelsa. A native protead, which we had seen in the Albert Park in Auckland.

Hebe salicifolia. One of 70 some species of this genus, which has its center of distribution in New Zealand.

Aristotelia serrata, of the Elaeocarpaceae. A small genus with species in New Zealand, Australia and South America.

Schefflera digitata and *Pseudopanax arboreum;* evergreen members of the large tropical Araliaceae.

We left Rotorua on January 2 and flew to Wellington (at the southern end of North Island) where we spent the night

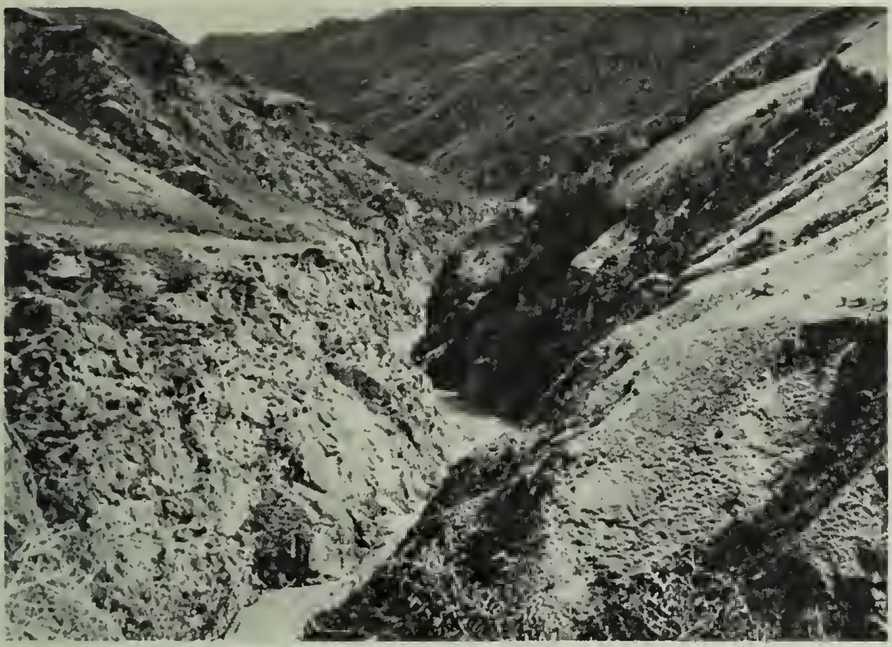

Fig. 10. The road to Skipper's Canyon

before flying on to Christchurch the following morning. That afternoon we were called for by Mr. H. G. Gilpin and conducted to the Christchurch Botanic Garden, of which he is the Director.

This garden, which celebrated its hundredth anniversary a few years ago, is the finest of its kind in New Zealand. Bounded on one side by the River Avon, it covers an area of more than 60 acres and includes ponds, a rock garden, a heath garden, perennial borders and glass houses containing excellent tropical ornamentals as well as a superb collection of cacti and succulents. The last-named are effectively displayed against a dioramic background of desert scenery (Fig. 7).

In this garden we observed many native plants and a wealth of material from other parts of the world. The former included fine specimens of *Cordyline australis* (which some of the early explorers had mistaken for the dragon tree of the Canary Islands) and New Zealand flax, *Phormium tenax,* here in full bloom. We were particularly pleased in one of the rock gardens to see the genus *Raoulia.* This member of the Compositae forms dense cushion-like mounds in the southern alps, where it is called vegetable sheep. The genus *Nothofagus,* which is known as beech throughout New Zealand, was here represented by *N. Solandri* and *N. Menziesii.* We were pleased also to see *Olearia,* the tree daisy, of which many species are indigenous to New Zealand.

Among plants introduced from other lands, we were vastly impressed by an enormous tree of *Arbutus Menziesii* (the madrono of our Pacific coast); it was over 40 feet tall and quite the largest we had ever seen. Here again was *Magnolia grandiflora* and in addition *M. Campbellii* and *M.* x *Watsonii.* There was a magnificent tree of *Araucaria araucana,* the monkey-puzzle tree from Chile and from that country also *Gunnera manicata,* its gigantic leaves completely filling one side of a pond. Following our tour of the garden, Mr. Gilpin took us to his residence on the grounds where we had tea with his wife and son.

The following morning we returned for a brief visit to the garden, then drove to the outskirts of Christchurch to call upon Mrs. Madge Shields, an amateur botanist, who has a superb collection of cacti and succulents.

That afternoon Mr. L. J. Metcalf, Assistant Director of the garden, drove us up into the South Port Hills of the Banks Peninsula to see something of the native vegetation. In protected hollows in these hills the bush is very dense, with a profusion of ferns under the shade of such plants as *Pseudowintera colorata* (a relative of the Magnolias) and *Fuchsia excorticata* (the same tree fuchsia we had seen at Lake Okataina). Other woody genera, with which we had by this time become familiar were *Hoheria, Griselinia* and *Coprosma.*

The open grassy slopes and exposed headlands presented a very different aspect and supported such genera as *Aciphylla* (a strange member of the Umbelliferae with basal tufts of stiff grass-like leaves and dense spikes of flowers) and *Hymenanthera* (a low matted shrubby member of the Violaceae). A hazardous climb up the side of a steep cliff was rewarded by views of Lyttelton Harbor in the far distance and another species of *Raoulia* under foot; this one *R. glauca.* Mr. Metcalf's intimate knowledge of the local flora made this a most enjoyable and profitable afternoon and we are deeply appreciative of his assistance.

The following day, January 5, we flew from Christchurch to Queenstown. For some 300 miles this flight follows the line of the Southern Alps, providing spectacular views of snow-clad mountains, dominated by Mt. Cook (12,350 feet) and the Tasman Glacier (Fig. 8).

Queenstown is a delightful small city located on the shores of Lake Wakatipu and surrounded by high mountains. (Fig. 9). On the morning following our arrival we took the photogenic flight to Milford Sound. As the plane followed a tortuous course hemmed in by snow-clad mountains we could not escape the feeling that we were in Norway. In the afternoon we drove along winding mountain roads to Skipper's Canyon, a region made famous during the gold rush of last century. (Fig. 10.) In between these two sight-seeing jaunts we paid a visit to

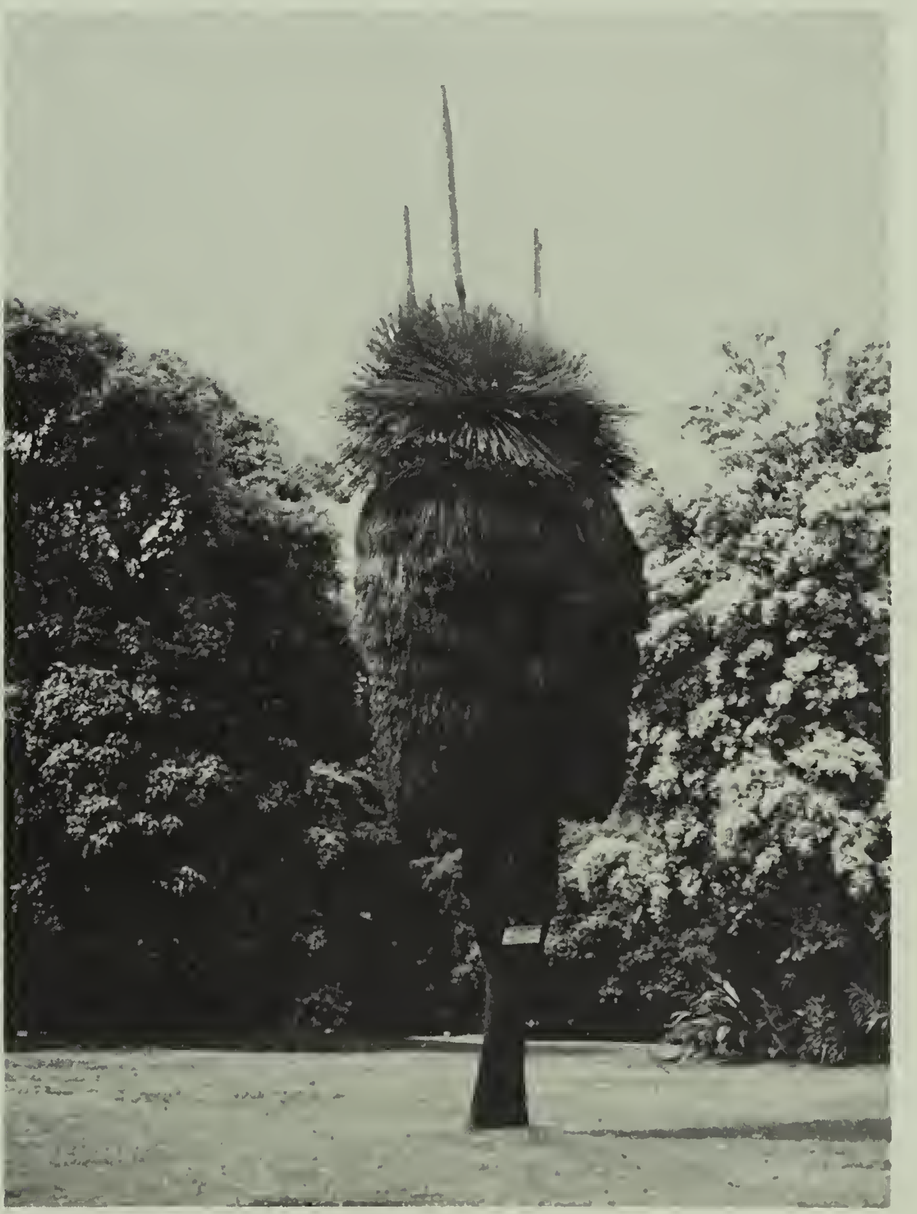

Fig. 11. *Xanthorrhoea resinosa* in the Melbourne Botanic Garden

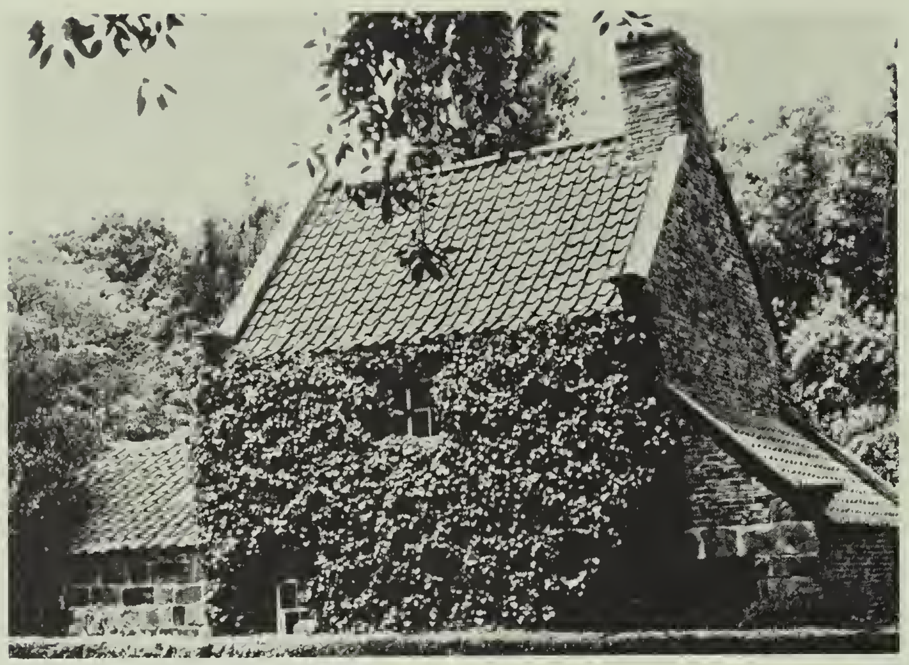

Fig. 12. Captain Cook's cottage in Fitzroy Park, Melbourne.

the Queenstown Domain where we were cordially received by the superintendent, Mr. N. H. Leefe.

This small but very choice garden contains some extremely fine trees, including specimens of coast redwood (*Sequoia sempervirens*) and California big tree (*Sequoiadendron giganteum*) which would grace any arboretum in the world. Among other western American conifers *were Abies nobilis, A. concolor,* and the Douglas Fir, *Pseudotsuga Menziesii.*

In both New Zealand and Australia we were struck by the phenomenal growth of many of our American trees which seem to thrive better here than they do in their native haunts. This is especially true of the Monterrey pine (*Pinus radiata*) which is widely grown in forest plantations.

Araucaria araucana here was in full fruit and when Mr. Leefe presented us with some of its seeds we recalled how Archibald Menzies had introduced the species from Chile into England by pocketing some of the "nuts" which had been served to him at a state dinner. We were pleased to observe at close range *Nothofagus fusca,* for this was the "beech" which, on our flight to Milford Sound, we had seen clothing the lower levels of the ravines. The "rata" here was *Metrosideros australis,* which we had not seen previously and the genus *Sophora* was represented by *S. tetraptera,* usually considered the national flower.

We left Queenstown on Friday, January 7, and flew to Mt. Cook where we had lunch at the spectacularly situated Hermitage Hotel. We then returned to Christchurch where we changed planes for Melbourne, arriving there early that evening.

The following morning found us engaged in a preliminary visit to the magnificent Royal Botanic Gardens of Melbourne which were established in 1846. These gardens which comprise approximately 90 acres contain a pond and a large lake and are divided into ten sections or lawns representing various accessions during the garden's history. The existence of these lawns in no sense detracts from the overall beauty of the gardens, but, rather provides an opportunity for a seemingly endless succession of vistas.

In Oak Lawn there are 45 species of *Quercus* from many countries in the Northern Hemisphere. In a section devoted to the Proteaceae, one of the most important of Australian plant families, are concentrated such genera as *Grevillea* (of which *G. robusta,* the "silky oak", is probably the most familiar), *Lomatia, Hakea, Banksia* and others. In the Myrtaceae, another huge family, are to be found *Tristania, Eugenia, Darwinia, Metrosideros* and, of course *Eucalyptus,* which alone contains some 600 species in Australia.

In a section devoted to *Magnolia* there was not only *M. grandiflora,* but more than twenty other species and cultivars.

Worthy of special note are *Calodendron capense* (Rutaceae) the Cape chestnut from Africa, the jacaranda (*J. mimosifolia*) from South America and *Brachychiton acerifolim* (Sterculiaceae) the Australian flame tree. All of these were in flower at the time of our visit, as was the "Christmas tree" *Ceratopetalum gummiferum* (Cunoniaceae) with its large panicles of pink and white blossoms.

We were greatly intrigued by a fine specimen of the Australian grass-tree, *Xanthorrhoea resinosa,* a member of the Liliaceae with a crown of wiry grass-like leaves and several tall flowering spikes. (Fig. 11.)

In addition to a rock garden there is a large area devoted to cacti and succulents where we saw many rare and interesting species.

The genus *Araucaria* was represented by two Australian species: *A. Cunningham* (the hoop pine) and *A. Bidwillii* (the bunya bunya). Another native Gymnosperm was *Agathis robusta,* which we had first seen in Auckland. One of the finest features of this garden is its distinguished collection of palms, in which practically all tropical regions of the world are represented.

That afternoon we drove up to the Dandelong Hills which offer a fine view of Melbourne, some 30 miles distant, and the following day we visited the Healeville Sanctuary where we saw many of Australia's unique animals: kangaroo, wallaby, echidna, dingo, koala, etc.

Before taking off for Healsville, however, we stopped briefly in Fitzroy Park to see Captain Cook's cottage. Capt. James Cook was born in Yorkshire and when the cottage at Great Ayton, where he had stayed between his famous voyages, was offered at auction in 1933 it was purchased by Sir Russell Grimwade, who arranged for it to be dismantled and re-erected in Fitzroy Park as a tribute to the man who had first sighted Australia at Everard Point in the state of Victoria, of which Melbourne is the capital. (Fig. 12.) This fortunate event happily coincided with the hundredth anniversary of Victoria's establishment as a state.

On the morning of Monday, January 10, we returned to the Garden, where we were received by Dr. David Churchill, the newly appointed Director. Dr. Churchill kindly showed us

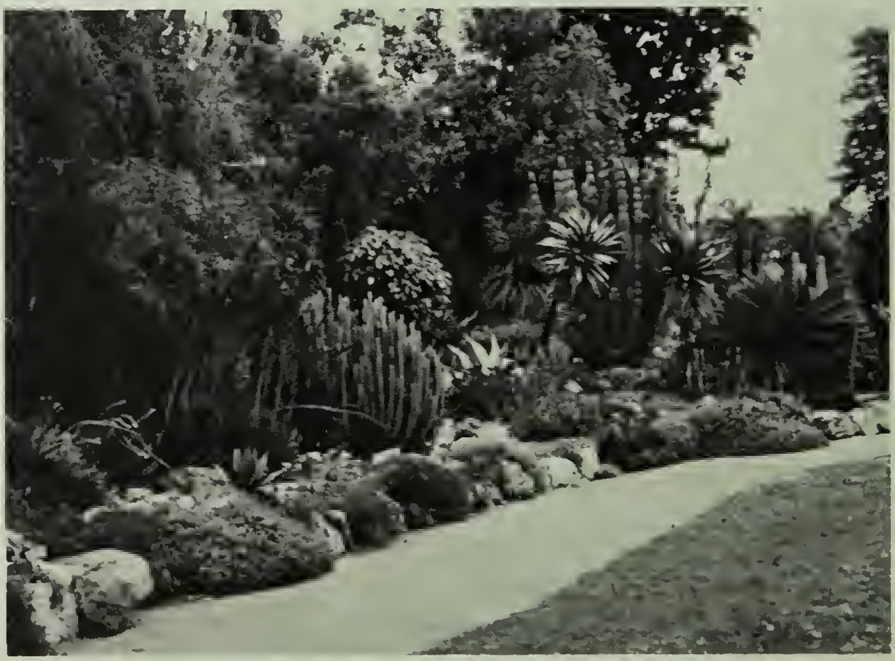

Fig. 13. Succulent bed in the Adelaide Botanic Garden

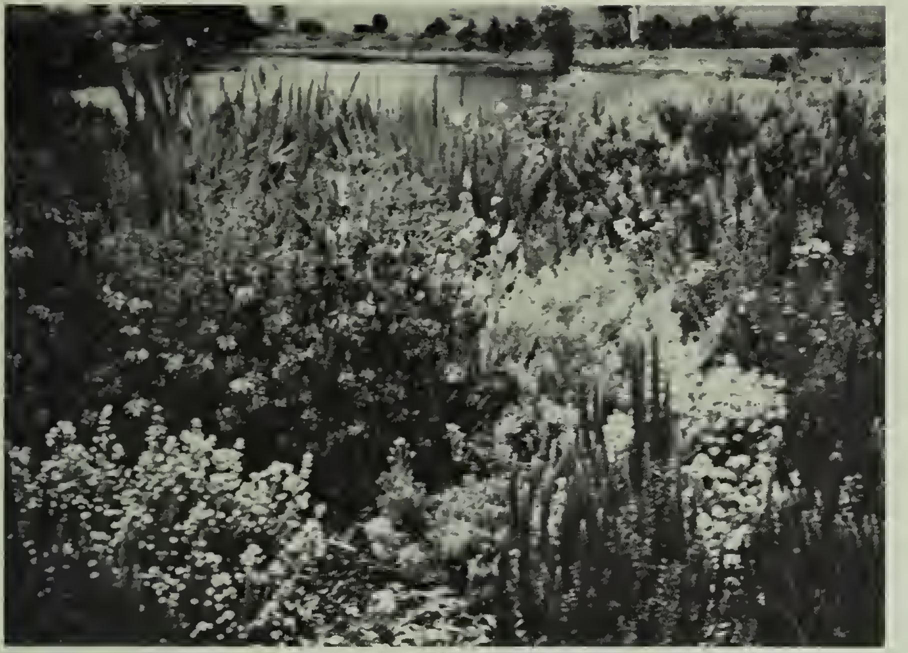

Fig. 14. Collection of Cape heaths at Wittunga.

around a portion of the grounds and arranged for us to spend some time with Dr. A. B. Court who had laid out for our inspection a fascinating series of specimens indicating the great historical importance of Melbourne's National Herbarium. Of Baron Ferdinand von Mueller's historic collections, many hundreds of type specimens are housed in this institution. Von Mueller was, without doubt, the greatest plant taxonomist Australia has ever known.

The following day (January 11) we flew to Adelaide, the capital of South Australia, and were met at the airport by Mr. T. R. N. Lothian, Director of the Adelaide Botanic Garden. The thing that strikes one first about this splendid garden is its spaciousness. Fine expanses of lawn set off the trees to good advantage and the undulating terrain makes for great diversity. Within its 45 acres are growing some 5000 species of plants both native and introduced. Some of the finest specimens of *Araucaria* we had seen were here, especially a huge bunya bunya (*A. Bidwillii*). Another remarkable plant was *Yucca elephantipes,* with numerous upright panicles of creamy white flowers, and still another was an enormous camphor tree, *Cinnamomum Camphora,* a native of southeastern Asia.

We had seen very little of the huge genus Ficus (800 species) but here among others were *F. Baileyana, F. rubiginosa, F. racemosa, F. religiosa* and *F. bengalensis.*

Few things enhance the beauty of a garden as much as water, and here one finds a large lake and several smaller ponds. These provide a habitat for a varied collection of nelumbos, waterlilies and other aquatic plants.

There are several glass houses, replete with tropical and semi-tropical material and around all four sides of one of them (the Tropical House) is a rock garden containing a phenomenal collection of cacti and succulents. (Fig. 13.)

In addition to the Administration Building and the building housing the State Herbarium there is a Museum of Economic Botany in which one could profitably spend many hours.

The following morning Mr. Lothian had arranged for a member of his staff, Mr. Ron Hill, to take us to see Wittunga Garden, a few miles from Adelaide. This garden which was recently given to the Board of Governors of the Adelaide Garden, was the private collection of the late A. Keith Ashby, who was keenly interested in the Cape heaths of South Africa. As a result there are some 80 species of *Erica* growing here. Although we saw several fine collections of *Erica* in Africa in January, 1971, we do not recall any that equaled this one (Fig. 14).

In addition to African heaths there were also present from that continent several proteads (notably *Serruria,* the "blushing bride") and a number of varieties of the attractive composite, *Gazania.*

Australian proteads were also here, as exemplified by fine plants of *Banksia serrata, B. speciosa* and *Grevillea Banksii.*

Mention has already been made of the Myrtaceae as one of Australia's predominant families. Here at Wittunga, in addition to the genera we had already seen, were such "newcomers" as *Regelia, Tristania* and *Verticordia,* all with numerous showy stamens.

In the southern hemisphere the place of the Ericaceae is taken largely by the closely related Epacridaceae and we were pleased to see here several species of *Epacris* with brilliant red tubular corollas. One of Australia's most publicized flowers is *Anigozanthos,* the kangaroo paws, of which there are about a dozen species. There was an elegant display of them here at Wittunga, ranging in color from light yellow to deep red.

We returned to the Adelaide Garden where my wife and I were the guests of Mr. Lothian at luncheon, and then went to inspect the Waite Agricultural Research Institute which administers an extensive arboretum. Of Australia's 600 species of *Ecalyptus* about half may be seen here. There is also an impressive representation of *Acacia, Casuarina* and members of the Proteaceae.

Adelaide is a beautiful city laid out in the form of a square with terraces on each of the four sides. Its park lands comprise 1700 acres and consist of gardens and squares within the city and a continuous belt encircling the city and separating it from the suburbs.

On the morning of Friday, January 14, Mr. A. F. Potter, Assistant Director of the Parks and Gardens Department, took us on a tour of much of the land administered by his Department. We saw a splendid rose garden, plantings of shrubs and perennials, a well stocked glasshouse and numerous recreational installations for wading, bathing, boating, etc. How wonderful it would be if every city could incorporate such beauty in its planning.

Australia, with an area approximately the same as that of the continental United States, has been characterized as a great central desert surrounded by a narrow fringe of vegetation. Although perhaps over-simplified, this description is essentially valid and because of our desire to see something of the outback (as much of the interior is called.) we left Adelaide on

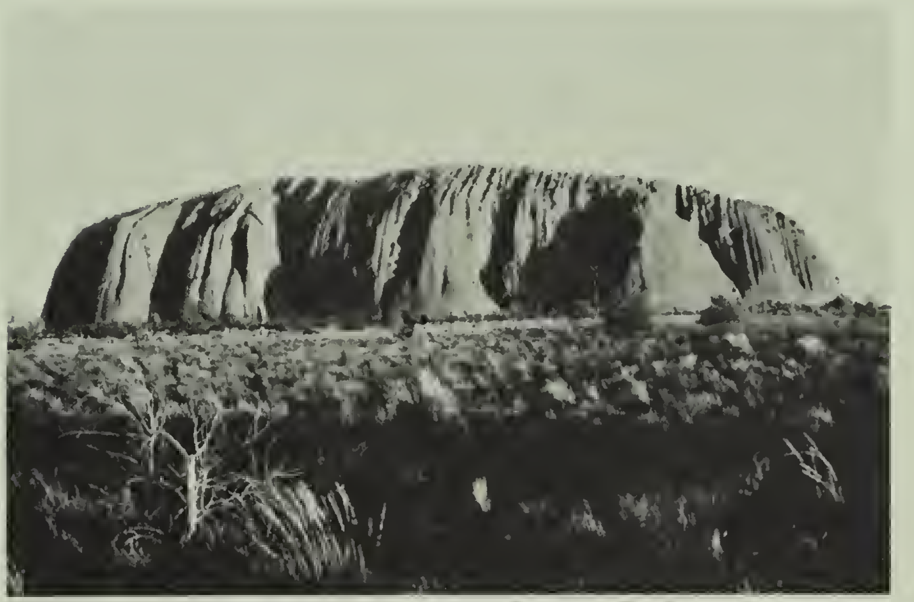

Fig. 15. Ayers Rock at sunset

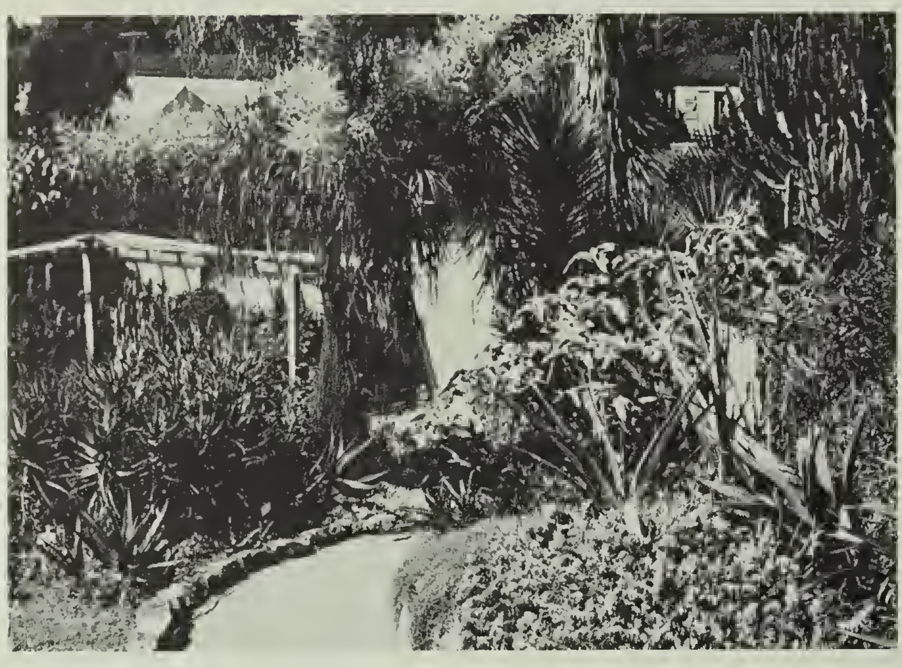

Fig. 16. A section of the Brisbane Botanic Garden

the afternoon of Friday, January 14, and flew to Alice Springs, which is near the geographic center of the continent. The following morning we went in a small plane to Ayers Rock, some 200 miles to the southwest. This flight took us across one of the most arid stretches of the country—an area which reminded us vividly of some of the sections of our southwest.

Ayers Rock is a spectacular monolith of reddish-brown arkose sandstone 1143 feet high and nearly six miles in circumference at the base. (Fig. 15). It is noted not only for the amazing colors imparted to it by the rising and setting sun, but also for the aboriginal paintings which decorate the many caves around its base. A few miles to the west of The Rock are the Olgas, a series of dome-shaped peaks famed for their bizarre shapes and colors. Together these two formations constitute a National Park.

As might be expected, the vegetation in the vicinity of Ayers Rock is meagre. Botanically it is known as "mulga", which signifies that it is composed of low evergreen shrubs and perennial herbs, often with coriaceous leaves. There are several species of wattles *(Acacia)*, a few of *Eucalyptus* and several members of the Chenopodiaceae such as *Rhagodia* or saltbush. There are several genera of the Gramineae, including the kangaroo grass and five species of lamb's tail *(Ptilotus)*, a member of the Amaranthaceae.

It was our very good fortune while at The Rock to make the acquaintance of Mr. Derek Roff, the Curator of this Park, who spent the following morning with us, entertained us at his home and showed us many interesting plants. One of Australia's specialties, which we had almost despaired of seeing, is Sturt's desert pea, *Clianthus Dampieri* (*speciosus*) a brilliantly red-flowered legume with a shiny black spot at the center of the keel. We were therefore delighted when Mr. Roff led us to a patch of it near his home. His garden is replete with such local genera as *Eremophila, Calandrinia* and *Codonocarpus,* the last named a slender tree which is common throughout the area. Thanks to almost unprecendented rainfall more plants were in flower here than would normally have been the case.

The most extensive coral formation in the world is the Great Barrier Reef which stretches for 1250 miles along the east coast of Australia. It was on this reef in 1770 that Captain Cook's vessel, the Endeavour, struck and it was here that, in order to lighten the ship the crew threw overboard six cannons and numerous other weighty items. Since this is a "must" for every visitor to Australia, we traveled by plane, and helicopter to spend two days on one of the 600 islands within the Reef. Hayman Island, 65 miles north of Mackay, is a delightful spot, affording bathing, wooded trails and coral viewing.

From Hayman on January 20 we flew to Brisbane, the capital of Queensland. Since we arrived at Brisbane in mid afternoon, there was time that day for a preliminary look at another of Australia's fine botanic gardens.

The following morning Mr. Harold W. Caulfield, the Director, favored us with a personally conducted tour of the grounds. Since this is the northernmost of the gardens we had seen (or were to visit) there were many plants here we had not found elsewhere. We had almost given up hope of seeing the celebrated wheel-of-fire tree *(Stenocarpus sinuatus)* in flower, but here it was in all of its glory—another truly handsome protead.

The collection is rich in palms, in woody members of the Liliaceae, such as *Dasylirion* and *Beaucarnea,* and in bamboos and ornamental foliage plants. As we had come to expect, there was a fine rock garden and another spectacular collection (both outdoors and under glass) of cacti and succulents. (Fig. 16.) Among the last-named was a plant, which delighted my wife, of the very rare *Lithops optica rubra* from South Africa.

After lunch Mr. Caulfield took us on a tour of the Mt. Tamborine National Parks System, some 40 miles north of Brisbane. Our first stop was at Joalah Park, where we walked for half an hour along a trail through a dense tropical rain forest—so dense, indeed, that taking pictures without flash was a complete impossibility. The trees here (mostly *Eucalyptus*) were growing close together, very tall and often festooned with a stag-horn fern (*Platycerium*).

Our next stop was at the Glen of Palms. The entrance to the Glen was through an open area where, to our delight, a family of wallabies was disporting itself. As we descended into the Glen we found ourselves surrounded by many thousands of tall slender upright trunks of *Archontophoenix Cunninghamiana,* one of Australia's three endemic palms. Almost the only other plant in this dense palm forest was *Sloanea,* a member of the Elaeocarpaceae, with thin buttresses reaching ten or fifteen feet from the main trunk.

Our final visit of the afternoon was to Macrozamia Park, the type locality for a cycad which by some botanists is known as *Lepidozamia Peroffskyana.* If this genus is to be accepted as distinct from *Macrozamia,* then the classical number of genera in the Cycadaceae will have to be increased. This is for the future to determine.

Saturday, January 22, found our small party on its way from Brisbane to Sydney, the largest city in Australia and the capital of New South Wales. That afternoon we paid a visit to Sydney's famous zoo.

On the following morning, (Sunday) we flew to Canberra, the capital of the Dominion, where the other four members of our group went off for a day of sight-seeing, while my wife and I were met by Mr. John W. Wrigley, Curator of the Canberra Botanic Gardens, who took us first to the top of Mt. Ainslie from which we had a superb view of this modern city and its environs. We then went to his home to meet his charming wife and four delightful children.

Unlike the other Australian botanic gardens we had visited, this one at Canberra is devoted exclusively to the cultivation of indigenous Australian plants. It is, therefore, in a very real sense the National Botanic Garden of Australia. Within its relatively small area of about 100 acres there are already established over 2300 species of native Australian species. As might

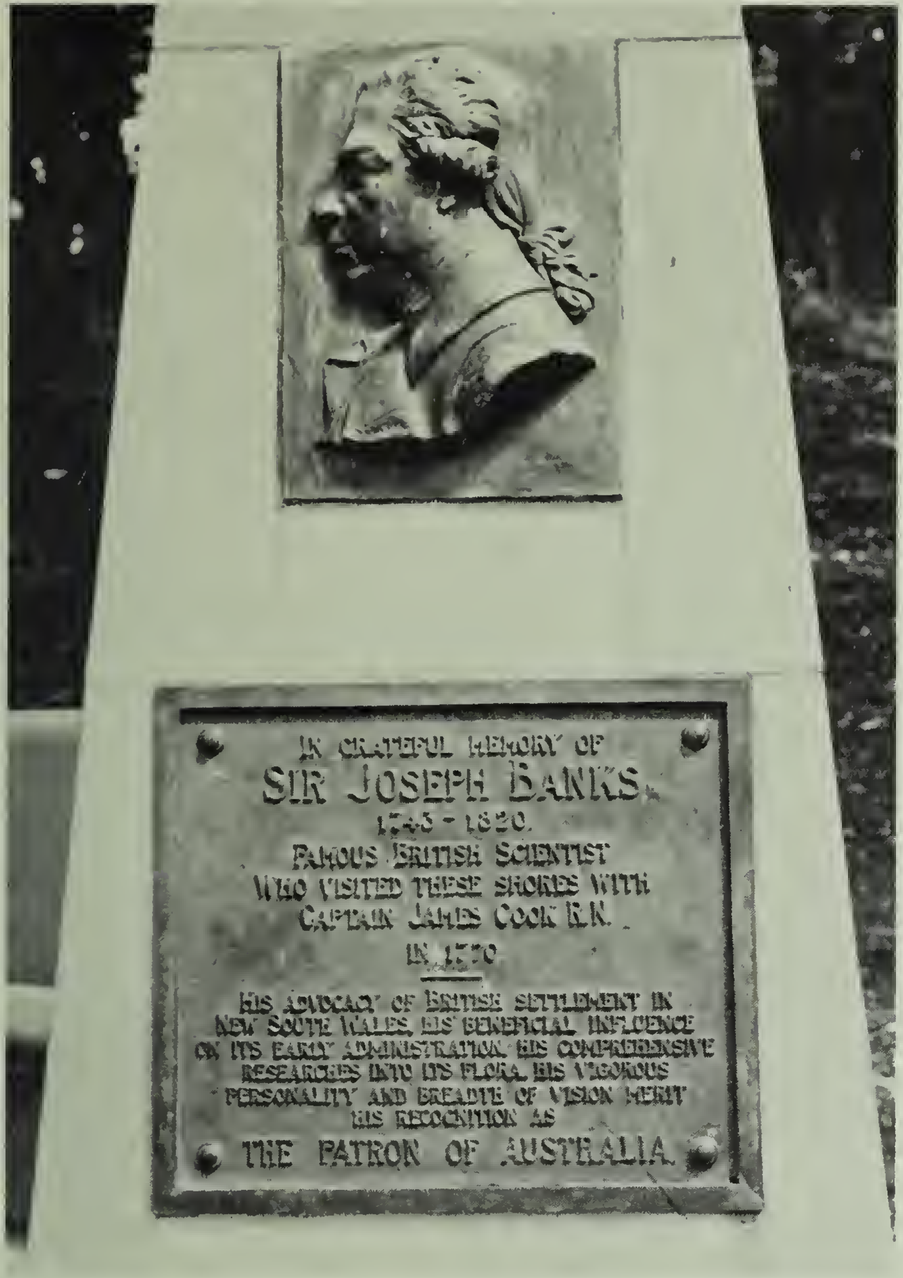
IN GRATEFUL MEMORY OF
SIR JOSEPH BANKS
1743 - 1820.
FAMOUS BRITISH SCIENTIST
WHO VISITED THESE SHORES WITH
CAPTAIN JAMES COOK R.N.
IN 1770
HIS ADVOCACY OF BRITISH SETTLEMENT IN
NEW SOUTH WALES, HIS BENEFICIAL INFLUENCE
ON ITS EARLY ADMINISTRATION, HIS COMPREHENSIVE
RESEARCHES INTO ITS FLORA, HIS VIGOROUS
PERSONALITY AND BREADTH OF VISION MERIT
HIS RECOGNITION AS
THE PATRON OF AUSTRALIA

Fig. 17. Monument to Sir Joseph Banks at Botany Bay.

be expected, the two plant families best represented are the Proteaceae and the Myrtaceae. Considerable space, however, is devoted to the Compositae, the Liliaceae, the Epacridaceae and a large number of smaller groups. One section is given over to aquatic plants and there is a small but fascinating reproduction of a tropical rain forest, replete with tree ferns, epiphytic orchids, etc.

Following a delicious luncheon at the Wrigleys, we were taken off on a sightseeing tour of Australia's newest and, in many respects, most beautiful city, after which we returned to their home for tea before being driven, with the entire family in attendance, to the airport for our return flight to Sydney. All of this is perfectly typical of the wonderful hospitality and gracious friendship which we encountered everywhere in New Zealand and Australia.

On Monday, January 24, our last full day on this southern continent, we spent the morning in the Royal Botanic Gardens at Sydney where, in the absence of Dr. J. S. Beard, the Director, we were shown around by Mr. Dangerfield, the Assistant Superintendant.

This garden, of about 65 acres, located along the south shore of one of the world's greatest harbors, is remarkable for its collection of mature trees, many of which date from the early nineteenth century. Fine specimens of the Port Jackson fig (*Ficus rubiginosa*) are to be seen here, as well as venerable trees of the Moreton Bay fig (*F. macrophylla*). The largest bottle tree (*Brachychiton rupestre*) we had seen anywhere was here. *Viburnum odoratissimum,* which we tend to think of as a shrub, was here a tree 30 feet tall and the same was true of the Chinese fringe-tree (*Loropetalum chinense*), which is doubtfully hardy in the Philadelphia area.

Here, again, as in all the gardens we had visited, was a distinguished collection of cacti and other succulent plants. The Aizoaceae of South Africa were particularly well represented by such genera as *Lithops, Conophytum, Faucaria,* etc.

On April 28, 1770, Captain Cook brought the Endeavour to anchor in a harbor just a few miles south of the present city of Sydney. Led by Mr. (later Sir Joseph) Banks, the botanists of the expedition went ashore and found such a rich variety of plants that they spent a week collecting and putting their specimens into papers. Cook records that he first gave the name Stingray Harbor to this place but that later (no doubt at the urging of the naturalists) he changed the name to Botany Bay.

We were naturally very eager to visit this famous locality and Mr. W. Watson, Superintendent of the Garden, kindly arranged for Mr. A. N. Rodd, a member of the staff, to drive us there that afternoon. The landfall is appropriately commemorated by monuments to Cook and Banks (Fig. 17) and nearby is a museum containing many interesting objects including one of the cannons thrown overboard on the great Barrier Reef. These cannons were recently recovered by a team from the Academy of Natural Sciences of Philadelphia.

The area around the monuments and the Museum has been made into a park, but a short distance away the native vegetation on windswept sandstone headland has been preserved and is thought to be just about the way it was over 200 years ago. It was thrilling to feel that we were seeing the same species which Banks had collected. Among the plants here were *Banksia,* (a protead named for Sir Joseph by the younger Linnaeus), *Baeckea* (a member of the *Myrtaceae*), *Westringia* (a labiate) and *Xanthorrhea,* the grass-tree mentioned before. One of the most exciting was *Actinotus,* the flannel flower, looking for all the world like an overgrown edelweis, but actually belonging to the Umbelliferae. (Fig. 18.)

The following day, January 25, we flew from Sydney to Fiji for a few days relaxation before starting on the long voyage home.

The Fijian Archipelago consists of some 300 islands, only a few of which are inhabited. We landed at Nadi on Viti Levu, the largest of the islands and drove some 50 miles to Yanuca

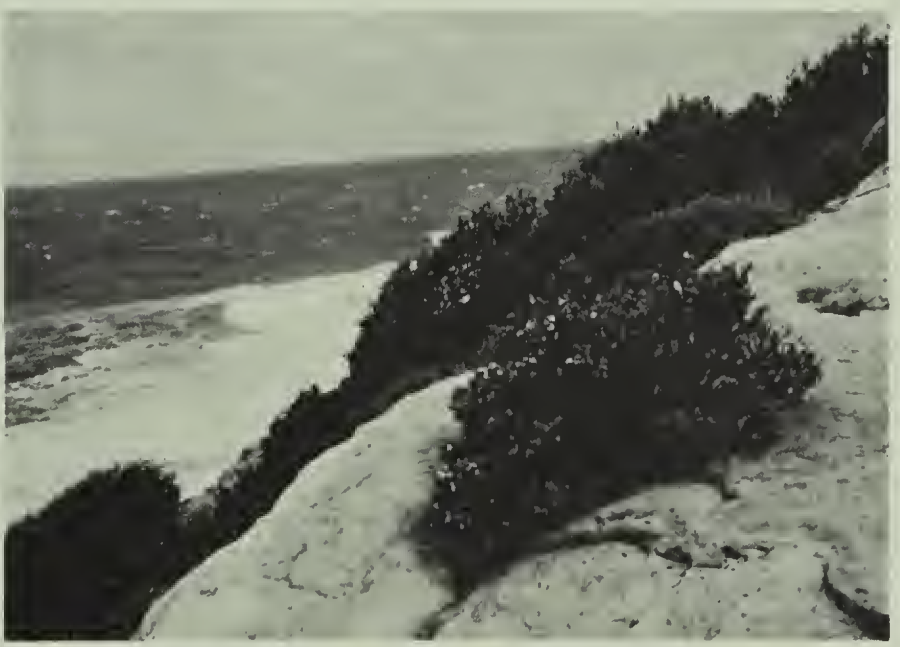

Fig. 18. Sandstone headlands at Botany Bay where Banks collected in April, 1770.

which is connected with it by a short causeway. The western side of the Viti Levu has only a moderate rainfall and has been largely cleared for the cultivation of sugar cane.

Our waterfront hotel at Yanuca was surrounded by palms and other tropical plants, most of them exotic and the same as ones we had seen in the Society Islands.

We drove 90-some miles one day to Suva, the capital, which is near the eastern end of Viti Levu. This side of the island is mountainous and characterized by dense tropical rain-forest. The most conspicuous flowering tree was the candle-nut (*Aleurites moluccana*), a member of the Euphorbiaceae.

Suva is an attractive city located on a harbor where ocean-going vessels put in. It boasts a small botanic garden (about ten acres) which has doubtless seen better days, but is still worthy of a visit. Among the mature specimens seen here were *Dillenia indica,* (a member of the Dilleniaceae with impressively large leaves), *Canarum commune,* (of the Burseraceae) the so-called Java almond, *Inocarpus fragiferus* (a legume with edible fruit) and *Terminalia arjuna,* a relative of the more widely planted sea almond, *T. Catappa.*

Adjoining the gardens is a museum which contains many exhibits dealing with history, art and ethnography. Here in a glass case, is the wooden rudder of H. M. S. Bounty. Following the mutiny in April 1789, the crew took the ship to Pitcairn Island, dismantled and burnt her in six fathoms of water.

To us this bit of wood seemed a fitting climax to a trip during which we had so often crossed the trails of the early navigators, explorers and botanists of the South Pacific.

THERAPY THROUGH HORTICULTURE

H. Richard Draper, III

Horticultural Therapy is one of the oldest forms of psychiatric therapy. Its value was recognized as early as 1798 by Dr. Benjamin Rush, the distinguished physician and American patriot, who proclaimed his conviction that gardening activities had a curative effect on the mentally ill.

Historically, patients were often forced to work on hospital farms to help pay for their hospitalization. It was eventually realized by many physicians that a greater percentage of patients who gardened were recovering and returning home, than was evident among those who did not participate in gardening activities. Consequently, gardening became an activity toward which more patients were directed as a purposeful part of their treatment program.

Sometimes called "rehabilitation through contact with nature", horticultural therapy has long been favored by Dr. Karl Menninger, who observed that involving patients with the beauty and mystery of growth helps them to relax and make a better adjustment to hospitalization and treatment.

Friends Hospital in Philadelphia is fortunate to have a broad range of facilities for its horticultural program. This institution is located on approximately one hundred acres of beautifully landscaped and wooded grounds. Greenhouses, coldframes, a nursery, and a variety of gardens offer great potential for a multitude of diversified projects in which patients may involve themselves.

For example, they may start cuttings in the greenhouses of various tropical houseplants, such as African violets, begonias, and geraniums. Cuttings of azaleas, hollies and other more hardy plants are raised in coldframes for at least their first winter. Many of the plants raised by patients are kept in the protected area of the nursery before either being sold during Garden Days in the spring or being planted on the hospital grounds. The hospital gardens include annuals, perennials, and a variety of herbs which patients may choose to raise from seeds, cuttings or divisions. The grounds themselves offer countless opportunities for them to encounter and identify both native flora and unusual plants whose origins are worldwide.

The therapist can reach the patient in a variety of ways. Considering the average patient stay (38 days) at Friends Hospital, the therapist has insufficient time to undertake a complicated project if he hopes to supply the patient with enough information to be successful outside the hospital at raising the plant material in which he is interested. The patient must have a feeling of achievement and develop self-confidence in order to overcome his anxieties and to equip himself to cope with problems he will face upon discharge. Most of them have little or no previous experience in working with plants, and usually what experience they have had, has been negative. For example, a woman may have received potted plants on various holidays and have been unable to care for them properly. In this case, the first obstacle to overcome is to convince her that she can grow plants. With the correction of some errors in her past approach and with a little knowledge of, and attention to, the plants' needs, she can grow them successfully. Cuttings, as a rule, offer a very successful way of reaching such a person, as they give immediate results (much more quickly than seeds) and once one has made him feel fairly secure, other plant material may be used.

The projects the therapist chooses for the patient should take into consideration the economics, space, and locale of his home environment. To neglect consideration of these aspects could lead to a frustrating situation for the patient instead of contributing to a continuing therapeutic involvement in horticulture.

Prior to working with the patient, the therapist receives from the patient's doctor pertinent background material relating to the history of his illness and environment. This information enables the therapist to guide the patient's involvement in a project. An identified hostile patient may be involved in an activity which appropriately provides release for pent-up hostility, such as smashing old and cracked flower pots into shards that can be used as drainage material in planters.

This activity both releases destructive feelings, and also channels their release toward an end which is positive and productive, leaving the patient free from potential post-act

The author (right) demonstrates the potting of azalea slips.

feelings of guilt and anxiety.

The depressed patient often finds delight in tending germinating seeds that he has planted or in caring for a cutting that has just sent out roots. When such extension of energy attention to something outside of himself is perceptably rewarded by successful response, he may be "brought out of himself" in such a way as to be better able to deal with his own problem of depression. Positive response to relation to plants can also facilitate the patient's successful interaction with people. The therapist often encourages him to teach another patient what he has learned about his project. Teaching "brings the patient out of himself" even more—supported by an awareness of the therapist's confidence in his ability to teach what he has learned, and the teaching serves as well to fix more permanently in his mind what he has learned. This guided interaction between patients can frequently help the therapist reach more difficult patients, as many of them are less suspicious of nonstaff personnel and will first respond to another patient before they begin to relate to the therapist.

The middle aged woman going through menopause and/or reaching the point in life where her children are growing up and leaving home can often turn to an interest in a particular phase of horticulture to direct her energies and find satisfaction in her ability to care for and raise her plants. African violets are among the many plants that seem to appeal to this type of patient. The African violet is relatively easy to raise and one can produce great numbers of them from leaf cuttings—this offers something requiring constant attention and the many successfully rooted cuttings can be given as gifts or exchanged with friends for other varieties. This helps the patient, directing her nervous energy in a way that is constructive and satisfying to her and it effectively relieves the pressure in what can often be a difficult period of adjustment.

Flower arranging and making up planters are effective projects for many of our patients. Learning basic design and figuring out imaginative ways of using relatively common materials that can be found readily in the house, yard, or along the roadside for making effective displays in the home can often be the key to involvement in horticulturally related hobbies. The flower arrangements and planters incidentally contribute a very important part of the general milieu at Friends Hospital, with patients, personnel and visitors alike taking pleasure in their abundance in the hospital buildings.

Written material on any plants in which the patient might be interested is available in the greenhouse library. Patients are also encouraged to make use of public libraries and to take advantage of the information available through plant societies and government agencies. They are also encouraged to feel that even after discharge they may contact the therapist to answer questions about where they may find the answers to problems in horticulture.

The hospital has tried to educate the public to the idea of horticulture as a psychiatric therapy by including an exhibit in the Philadelphia Flower Show. It is hoped that by helping to make the public more aware of horticulture's therapeutic value more people will turn to it as a satisfying hobby that can give much pleasure at the same time it provides an often needed outlet for tension and hostility or an inspiration for the person seeking beauty and a reason to be joyful. Properly channeled involvement in horticultural activities can help to serve as preventive medicine as well as helping in an effective cure.

NOTES FROM THE ARBORETUM

A NEW ROCK GARDEN

On the west slope of the Arboretum, just below the recently established heath garden, a new rock garden is under construction. The main purpose of this installation is to provide a site for a special collection of rock garden plants in honor of Dr. Edgar T. Wherry.

As an early member of the American Rock Garden Society and for many years editor of its Bulletin, Dr. Wherry is a recognized authority on this group of highly specialized plants. He is Emeritus Professor of Botany of the University of Pennsylvania and was a member of the faculty of the Arboretum School from 1942 to 1950 and again from 1954 to 1957.

The species destined for planting in the new garden have been carefully selected by Dr. Wherry and will be largely contributed by his many friends throughout the country. All of them are plants with which he has had some particular association, either as discoverer or through special study, such as the genus *Phlox,* on which he has published a monograph.

Work on this garden was started late in the summer of 1971 and was carried out by Mr. John S. Kistler, who is Chairman of the Delaware Valley Chapter of the American Rock Garden Society, and Mr. Morris Berd, President of the Wherry Memorial Garden. Mr. Kistler also was a member of the Arboretum faculty for several years.

Prior to the advent of freezing weather large and small rocks were so placed as to simulate natural outcrops and soil and leafmold were added to create pleasing contours and provide adequate space for root growth. One section of the garden will be devoted to plants of neutral or calcareous habitats, the other and larger portion will accommodate acid-tolerant species.

When completed this garden will stand as a memorial to Dr. Wherry and will serve as a source for the propagation of unusual plant material and its distribution to horticultural groups and other botanical gardens.

HARVEST SHOW EXHIBIT

At the annual Harvest Show, sponsored by the Pennsylvania Horticultural Society and held at Memorial Hall on October 1st and 2nd, the Arboretum staged an exhibit of fall fruits.

We are greatly indebted to one of our Alumnae, Mrs. George Frings, who collected, labeled and arranged 90 species of fall-fruiting specimens of trees and shrubs in a manner that was both attractive and instructive. We are also grateful to Mrs. Robert T. Barnes, who assisted Mrs. Frings in assembling the material.

The genus best represented was *Cotoneaster* with eight species, their fruits varying from red through purple to black. *Viburnum* was next with six and *Malus* and *Ilex* followed with five each.

Other genera with at least three species were *Cornus, Crataegus, Berberis* and *Callicarpa.*

One of the items which exited considerable attention was the yellow-fruited dogwood, *Cornus florida xanthocarpa.* Another was the glory-bower, *Clerodendron trichotomun,* its bright blue drupes accentuated by the bright red, star-shaped calyx.

Without doubt the most unusual item in the exhibit was a large spray of a *Koelreuteria* with bright pink capsules, quite different from the dull brownish fruit of the golden-rain tree, *K. paniculata.* This specimen was collected from a tree standing front of the gallery which was obtained in 1960 under the name of *K. integrifolia.* It is the plant which was discussed in Number 5 of this Newsletter (August 1970) where it was wrongly called *K. elegans.* This genus is at present being carefully studied by Dr. Frederick Meyer, of the U.S. National Arboretum, and we hope that in the near future the correct name of our plant can be announced.

Section of the Arboretum's exhibit at the Harvest Show.

THE STAFF

On September 12 Dr. Gordon conducted a "Grass Clinic" at the Schuylkill Valley Nature Center and beginning September 23 he gave a series of eight weekly lectures on "Plant Ecology" for the Department of Horticulture at Longwood Gardens. On December 8 he delivered a lecture on "Trophic Levels in the Ecosystem" in the Planetarium of West Chester State College. During January he and Mrs. Gordon visited several state parks forests, wildlife preserves and gardens in the southeastern United States and on February 25 he gave an illustrated talk entitled "Glimpses of the Fungus World" to the MORA Club in West Chester.

As a member of a partnership called Millcreek Associates, Dr. Penny is participating in the cloning, sales and distribution of several varieties of hybrid poplars for reclamation and large-scale landscape use. With a group of students he is conducting a series of grafting experiments on woody members of the Saxifragaceae to determine compatabilities and evidence of relationships.

At a meeting of the Philadelphia Botanical Club held on December 16, 1971, Dr. Fogg gave an illustrated lecture entitled "A Botanist in South Africa". On February 9, 1972, he spoke to the Twin Valleys Garden Club on "Unusual Trees and Shrubs" and on March 12 he gave an illustrated lecture on "Magnolias" at the Tyler Arboretum.